Maintaining a Competent Public Health Workforce: Lessons Learned from Experiences with Public Health Accreditation Domain 8 Standards and Measures

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ABSTRACT

Context: Public health accreditation is an ongoing national movement to improve the quality of public health departments and the public health system in the US; however, calls have been made for more evidence regarding best practices in the accreditation process.

Objective: The purpose of this work is to provide evidence about best practices in the accreditation process, specifically within the workforce development domain. It is the first in-depth investigation into workforce development using data collected by PHAB.

Design: Using de-identified accreditation application data from PHAB, this study employs a mixed methods approach to examining practices, lessons learned, challenges, and strategies pertaining to workforce development planning for Domain 8.

Setting: United States

Participants: US State (n=19) and Local Health Departments (n=115)

Main Outcome Measures: PHAB assessment scores for the workforce measures and the relationship between the health department's approach to meeting a PHAB measure criteria and the PHAB assessment score

Results: Of the 9 different approaches identified as ways of *encouraging the development of a sufficient number of qualified public health workers* (Version 1, Measure 8.1.1), only one approach (local health department internship programs with schools of public health; B=0.25, $p<0.03$) was significantly related to higher scores. An opportunity for improvement identified for measure 8.2.1 was that plans missing a clear identification of the gap between current staff competencies and staff needs were associated with a 0.88 point decrease in the 4-point score ($p<0.001$).

Conclusions: Findings suggest that there are approaches adopted for meeting PHAB Domain 8 measures that will impact the overall conformance assessment and score of a health department pursuing accreditation. There are several opportunities for improvement that health departments might consider when planning for accreditation or assessing their activities.

This is the author's manuscript of the article published in final edited form as:
Yeager, V. A., Wharton, M. K., & Beitsch, L. M. (2018). Maintaining a Competent Public Health Workforce: Lessons Learned From Experiences With Public Health Accreditation Domain 8 Standards and Measures. Journal of Public Health Management and Practice, Publish Ahead of Print. https://doi.org/10.1097/PHH.0000000000000750

INTRODUCTION

Public health accreditation is an ongoing national movement to improve the quality of public health departments and the public health system in the United States (US). This voluntary accreditation program is based on national standards for health department quality and performance as per the 10 Essential Public Health Services.[1-13] A basic structure and set of guidelines are provided to public health departments to assist them with the process of initiating new or reorganizing existing policies, plans, and programs to meet criteria and documentation standards for the 12 Domains included in the accreditation program.[1,3]

Since the program began in 2011, 178 million people or 58% of the US population reside in a jurisdiction that is accredited by the Public Health Accreditation Board (PHAB), which is a total of 187 health departments (data as of March 2017).[4] While the evidence is mounting that the accreditation process is beneficial for the health department and there seems to be ongoing momentum toward accrediting additional health departments, to date research evidence regarding the impact of specific accreditation domains and activities remains limited.[14] In fact, the majority of the studies conducted on public health accreditation have been focused on factors that may facilitate or serve as barriers to a health department's decision to pursue PHAB accreditation[15-20] and case studies about accreditation experiences.[21-23] Findings suggest that facilitators include collaboration with other stakeholders,[24,25] presence of leadership and incentive structures,[26,27] having larger jurisdictions,[15] being situated in a pro-accreditation centralized state health department[19,20], certain legislative factors,[22,28] the presence of established quality improvement initiatives[29,30], and higher numbers of full-time employees. Conversely, studies have also examined health department barriers to pursuing or success in seeking accreditation – consistently finding that the time and effort required for the process exceeded the perceived value of accreditation.[15,21,20,31] Other studies have examined accreditation and community health needs assessments, strategic and quality improvement plans, and preparedness.[32-36] While these studies provided valuable information in the early years of national voluntary accreditation, PHAB's 2015 research agenda calls for more evidence regarding best practices identified through the accreditation process.[37]

The purpose of the current study is to contribute to closing this knowledge gap and provide more evidence about the accreditation process. Specifically, this study focuses on Domain 8 (PHAB Standards and Measures Version 1 and Version 1.5),[38] *Maintain a Competent Public Health Workforce,* which requires health departments proactively plan for personnel recruitment, retention, and training through a workforce development plan.[39] Despite the growing number of accredited health departments as well as new applicants, there is limited information about health department approaches to strengthening workforce development planning and programming through the accreditation process. Given ongoing workforce shortages coupled with recent reports that a large proportion of the public health workforce intends to retire in the near future[40] and the current mismatches between the educational pipeline and new public health workforce,[41] evidence about impactful Domain 8 practices and potential lessons is especially important.

Using de-identified accreditation application data from PHAB, this study employs a mixed methods approach to examining practices, lessons learned, challenges, and strategies pertaining to workforce development planning for Domain 8. The purpose of this work is to provide evidence about best practices in the accreditation process, specifically the workforce development domain. It is the first in-depth investigation into workforce development using data from PHAB. Given the resources and time that are dedicated to pursuing voluntary accreditation these workforce development insights may be beneficial to health departments considering or pursuing accreditation or initiating the re-accreditation process. Furthermore, policymakers evaluating the impact of accreditation standards related to the public health workforce may benefit from better understanding how Domain 8 standards and measures are being met.

METHODS

This cross-sectional study employs data from Domain 8 across all health departments that had achieved a formal accreditation status from PHAB between February, 2013 and May, 2016. Data consists of PHAB registration data and descriptive summary reports for each measure from the accreditation site visitors. Data were qualitatively reviewed for variables explained below. Variables were then coded for quantitative analyses.

Data and Variables Used

The data used for this study were provided by PHAB and included de-identified, organizational-level information and site visit report data. Site visit report data was both quantitative and qualitative. The quantitative site visit report data included measure assessment scores and binary variables indicating if an action plan incorporating this measure was requested by PHAB. The qualitative component of the site visit report data includes site visitor comments, areas of excellence, opportunities for improvement, and notes specifying action items (when applicable), for each measure. Data are collected through review of submitted documents and during the PHAB site visit. At that time health department staff are given the opportunity to explain and answer questions regarding the documentation submitted to PHAB for each domain. These data reflect the organization's conformity to Domain 8 criteria.

Organizational information included health department jurisdiction (e.g., state or local), region (e.g., Northeast/Mid-Atlantic, Southeast, Midwest, Mountain/Northwest, or Southwest/Western), and organizational structure (e.g. centralized, decentralized, mixed, or shared). Continuous organizational variables such as the size of the population served, annual budget, and number of full-time employees were converted to categorical data for analyses (see Supplemental Digital Content, Table 1). Other organizational information included site visit assessment scores, which measured the extent to which the documentation and evidence provided by the health department conformed with each Domain 8 measure. Site visit scores ranged from 1-4, where *1 = Not Demonstrated, 2 = Slightly Demonstrated, 3 = Largely Demonstrated, 4 = Fully Demonstrated*.[38]

Domain 8 descriptive data were qualitatively reviewed by two members of the research team. Based on guidance documents and examples (provided by PHAB in the Standards and Measures document) regarding means to demonstrate meeting Domain 8 criteria, a list of

possible activities was used to extract information on each organization's Domain 8 activities and experiences. Although the identification of the presence of pre-identified PHAB activities was clear, the research team conducted a second review and one additional quality assurance check where researchers selected observations at random and checked for consistency across all observations. The following potential activities were sought in the qualitative review: workforce recruitment activities such as hosting internships and attending career fairs, health department workforce development plan design and implementation, leadership and management development and training, and if states provided educational opportunities and technical assistance to the local health departments. Data generated from these qualitative reviews included new binary variables for each activity (coded 1 when the activity was conducted by the health department, 0 when it was not).

Site visit reports also include sections for optional comments about "areas of excellence" for a measure, as well as "opportunities for improvement" for each measure which were also coded for frequency of themes that emerged from review of the report data. Finally, an action plan variable was also collected for each Domain 8 measure, which indicated if the health department was required to include this measure as part of an overall corrective action plan required by PHAB to complete prior to earning accreditation status.

Measures were selected from Domain 8, *Maintain a Competent Public Health Workforce*. A full list of variables extracted from the data is provided in Table 1. Note that all measure reference numbers discussed in this study refer to Version 1.0 but also include those Version 1.5 numbers that corresponded accordingly. Specifically, Version 1.0 measures included 8.1.1 (Encourage the development of a sufficient number of qualified public health workers), 8.2.1 (The workforce development plan), 8.2.2 (Provide leadership and management development activities), and 8.2.3 (Provide training or technical assistance to local health departments if a state health department) were included in this study. Note that because some of the measure numbers changed between Versions 1 and 2, Version 1 measure 8.2.2 data and its matching Version 1.5 measure 8.2.3 data were aggregated. As well, Version 1 measure 8.2.3 data were aggregated with Version 1.5 measure 8.2.5 data. Version 1.5's measure 8.2.4, related to work environment, was excluded from this analysis since so few health departments in the

sample applied under the PHAB standards Version 1.5 and there was no equivalent Version 1.0 measure. Similarly, the two new required documents for Version 1.5 measure 8.2.2 - documents 1 and 2 (an administrative measure and a requirement to recruit a workforce reflective of the population served) - were excluded from the analysis because there were no equivalent Version 1.0 measures. The PHAB assessment, areas of excellence, and opportunities for improvement were coded for their inclusion of each required document or possible approach to meeting the intent of the corresponding PHAB measure.

Data Analysis

Descriptive statistics were collected to explore the state or local health departments' average levels of success in meeting the PHAB measure requirements. Multivariate analyses examined the relationship between the health department's approach to meeting a PHAB measure criteria and the PHAB assessment score for the corresponding measure. Control variables included health department type (state or local health department) and the version of PHAB Domains and Measures (Version 1.0 or 1.5). Analyses were conducted using STATA 13.0.[42] Significance was measured at $p<0.10$, $p<0.05$, and $p<0.001$. This study was exempt from human subjects ethical considerations as it focused on organizational information.

RESULTS

PHAB data from 134 health departments were examined in this study. State health departments represented 14.2% (n=19) and local health departments comprised 85.8% (n=115) of the sample (see Supplemental Digital Content, Table 1). There were no tribal health departments included in the data. The majority of the health departments applied for accreditation under PHAB Domains and Measures Version 1 (n= 131) versus Version 1.5 (n=3). The selection included geographically diverse health departments across the country, serving a wide range of jurisdiction size. The majority of health departments included were from states with decentralized organizational structures (n=102, 76%). Annual budgets ranged from less than $500,000 to over a $1 billion, with roughly 80% (n=108) having budgets in the $1 million to

$100 million range. Health department number of full-time employees (FTEs) ranged from fewer than 10 (n=2) to over 15,000 (n=1), with 81% (n=109) in the 50-500 FTE range (see Supplemental Digital Content, Table 1).

For the four Domain 8 measures included in this study the mean scores ranged from 3.47 to 3.87 on a four-point scale (where 1 = Not Demonstrated, 2 = Slightly Demonstrated, 3 = Largely Demonstrated, 4 = Fully Demonstrated). Action plans were not common within the workforce development domain. More specifically, there were between 3 to 5 total action plans related to each measure, meaning only 2.24%-5.26% of health departments received action plans involving a Domain 8 measure (see Table 3).

Findings for Measure 8.1.1 Encourage the development of a sufficient number of qualified public health workers

Many health departments elected to provide a population health-oriented internship program in partnership with a school of public health (84% of SHDs, n=16; 39% of LHDs, n=45). Clinical internships were also a popular approach to meet the intent of the measure for LHDs (30%, n=35) (see Table 3). PHAB accepts a variety of approaches to fulfill the intent of the 8.1.1 measure. As such, 9 different activities were identified in the site visit reports. These included school of public health internships, clinical internships, health department staff guest lectures at schools of public health, participation in job fairs, college internships, high school internships, job placement for graduates, health department staff holding faculty positions at affiliated schools, and informational media targeting the future workforce (i.e., website, brochure, etc.). Only one of these activities was associated with a better PHAB assessment score on the measure. Local health department internship programs with schools of public health were significantly related to higher scores ($B=0.25$, $p<0.03$) (see Supplemental Digital Content, Supplemental Digital Content, Table 2).

There were several opportunities for improvement identified consistently in the site visit reports (see Table 4). Some of them were found to be associated with a decrease in measure conformance assessment at a statistically significant level. For example, when the internship or job placement program described is *not* population health focused such as clinical

rotations in the health department setting that do not include specialized training on population health, there was an associated decrease of 2.7 points on a 4-point scale ($p<0.001$). Also, health department efforts that do *not* promote future careers in public health directly (i.e., public health education campaigns or public awareness presentations that do not include workforce recruitment) were associated with a decrease of 0.44 points on a 4-point scale.

Findings for Measure 8.2.1 The Workforce Development Plan

PHAB listed three granular expectations for the workforce development plan, unlike 8.1.1 that allowed for a variety of approaches. Specifically, 8.2.1 included: 1) develop a training plan and schedule, 2) assess staff competencies compared to the core public health competencies, 3) evaluate gaps in staff competencies compared to plan and address with training, etc. Completing any of these approaches was associated with a 1.6 to 1.8 point increase on a 4-point scale ($p<0.001$) (see Supplemental Digital Content, Supplemental Digital Content, Table 2).

There were several key opportunities for improvement identified for measure 8.2.1 (see Table 4). Plans missing a clear identification of the gap between current staff competencies and staff needs were associated with a 0.88 point decrease in the 4-point score ($p<0.001$). Also, health departments that provided examples of trainings that took place before the workforce development plan was completed or were not aligned with the schedule outlined in the workforce development plan were associated with a 0.83 point decrease in the score ($p<0.001$). Lastly, if the workforce development plan was not reviewed and updated annually there was a 0.98 point decrease in the score ($p<0.001$).

Findings for Measure 8.2.2 Provide leadership and management development activities

PHAB expectations for measure 8.2.2 are less explicit than 8.2.1. A total of five approaches for meeting this measure's criteria were identified in the review of site visit data. These included training and continuing education activities, leadership development activities, tuition assistance programs, support for professional conference attendance and presentations, and support for professional organization membership. Among these approaches training and continuing education and leadership development activities were found to be associated with

an increase of 0.88 ($p<0.001$) and 1.5 ($p<0.001$) points respectively for the 4-point score (see Supplemental Digital Content, Supplemental Digital Content, Table 2). Only one consistent opportunity for improvement was identified for this measure. Specifically, when the health department-sponsored leadership and management development activity timeframe did not align with the schedule outlined in the workforce development plan it was associated with a decrease of 1.4 points in the score ($p<0.001$) (see Table 4).

Findings for Measure 8.2.3 Provide training or technical assistance to local health departments if a state health department

Three discrete approaches were taken by states to meet this measure. These included providing technical assistance to the LHDs, providing training to LHD staff, or providing tuition reimbursement programs to LHD staff (see Table 3). The only marginally significant approach found for meeting the criteria for measure 8.2.3, "providing training to local health departments," was found to increase the score by 0.7 points ($p<0.1$) (see Supplemental Digital Content, Supplemental Digital Content, Table 2). No opportunities for improvement were identified for this measure.

DISCUSSION

Strategies for improving the public health workforce development are crucial to the viability of the public health infrastructure in the US. This current and urgent need for continuous workforce development is heightened by the anticipated increase in demand for competent, new public health workers as baby boomers retire[39] and gaps remain between the educational pipeline and new public health workforce.[41] Findings from this study, the first of its kind to utilize internal PHAB data, provide insight about approaches to conformance with Domain 8's public health workforce standards and measures. Such findings will be of particular interest to health departments planning to or participating in the PHAB accreditation or accreditation renewal processes. This paper interprets performance data from Domain 8, providing feedback for administrators and accreditation coordinators involved in accreditation

planning and implementation, and summarizes the various means by which health departments are preparing for public health accreditation.

PHAB accreditation is predicated upon a mixed qualitative and quantitative decision arrived at by an objective accreditation committee and the scoring described herein is only one dimension within a highly complex deliberation that determines an individual health department's accreditation status. Nonetheless, this study offers insight into activities and practices that may help health departments craft impactful workforce development strategies. Partnering with a school of public health to provide internship opportunities was the only activity found to be significantly related to conformance with measure 8.1.1. For the prerequisite workforce development plan itself, adopting a comprehensive strategy and including all three requested elements increased the likelihood of conformance. Similarly, for measure 8.2.2 training and continuing education as well as leadership development made a favorable assessment impression.

For the most part, health departments tended to meet PHAB criteria within the domain, with very few health departments requiring action plans for these measures. This stands in stark distinction with the action plan requirements across other domains – overall, about one-third of health departments have been required to submit and complete action plans. Still, knowing what *not* to do in the workforce domain may provide guidance to health departments in the accreditation pipeline and increase the impact of the activities they undertake. Several approaches were found to be less consistent with expectations for Domain 8 standards. Having an internship or job placement program was a positive, however, one that is *not* population health focused was significantly related to a lower assessment. This emphasis may indicate that hosting interns and workforce development activities that are population health centered are encouraged. Although internships may be perceived to be a valuable partnership between public health and academic programs, there is not yet strong evidence that they lead to full time employment in these organizations following graduation, a topic PHAB may which to address when it next revises its Domain 8 standards and measures.[43]

Although having a workforce development plan is a requirement, some plans lack a clear identification of the gap between current staff competencies and staff needs. Additionally, it was not helpful to provide examples of trainings that took place prior to the workforce development plan or those that were not aligned with the schedule outlined in the workforce development plan. Lastly, simply having a workforce development plan in and of itself is not sufficient – health departments received lower assessments if their plan was not reviewed and updated annually. This makes sense from a quality improvement and performance perspective which encourages continual self-assessment and plan improvements. It also indicates that PHAB places strong value on the regular review of data to inform decision-making within the health department and that emphasis extends to the workforce development plan.

From the perspective of policymakers and stakeholders involved with the design of the PHAB standards and measures and the accreditation process, one important underlying question is whether state health departments, typically having greater resources, are pursuing accreditation differently compared to local health departments. Given that state health departments have larger budgets and more full-time employees to dedicate to the accreditation process, we examined differences between state and local approaches for meeting the measures as well as the scores and action plans. No meaningful differences were identified; however, it is important to note that that even the full universe of state health departments (n=50) is often underpowered to identify statistically significant differences.

LIMITATIONS

There are several limitations to note. First, because PHAB accreditation is voluntary, the health departments that decide to pursue accreditation may not be representative of all health departments in the country and generalizations based upon this sample must be made cautiously. Health departments of widely divergent sizes, budgets, and regions of the country are included, making the case that accreditation is possible for health departments of all types. Second, the data only reflect experiences of site visitors on the dates that the PHAB site visit was conducted or the when the documents were submitted to PHAB for the application

process. The assessments and narratives in site visit reports are developed by volunteer, peer site visitors based on their professional judgment. PHAB's efforts to ensure consistency in assessments and inter-rater reliability are multi-faceted, and include: training site visitors and requiring them to participate in exercises designed to increase the consistency of their reviews; providing guidance on the interpretation of the standards and measures; and reviewing all site visit reports. Third, it is important to note that PHAB does not consider their assessments as continuous variables, although they are treated this way for the purpose of this study. Fourth, because the sample size of SHDs in the study is relatively small (n=19), analyses were often underpowered to assess statistical significance or compare directly with LHDs. Because of this limitation, the results offer more insight related to LHD performance than SHD performance in achieving conformity with the PHAB standards. Lastly and importantly, the data used for this study reflect only the individual domain activities impact on the score the health department received for that particular measure as stated in the site visit report. Further research will be necessary to determine whether the individual domain activities and site visit scores reflect the health department's actual performance in and progress towards work force development.

CONCLUSIONS

Findings from this study suggest that there are areas of focus within approaches adopted for meeting PHAB Domain 8 measures that will impact the overall conformance assessment and score of a health department pursuing accreditation. Additionally, there are several noted opportunities for improvement that health departments might consider when planning for accreditation or assessing their activities. These results may be of interest to health departments seeking or maintaining PHAB accreditation as well as policymakers and other stakeholders involved in PHAB *Standards and Measures* design or the accreditation or reaccreditation process.

ACKNOWLEDGEMENTS

Data for this study was provided by the Public Health Accreditation Board.

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Table

Table 1. Variables Collected from Health Department Site Visit Reports for PHAB Domain 8 Workforce Development

Measures	Measure Description	Variables Collected from Site Visit Reports & Definitions
Version 1.0 Measure 8.1.1	Encourage the development of a sufficient number of qualified public health workers	**School of Public Health Internship:** Population health-oriented internships for BSPH, MPH, or doctoral-level public health students
		Clinical Internship: Population health-oriented internships for any students seeking clinical degree, including MDs/DOs, NP/PAs, RNs, RDs, LCSWs, OTs/PTs, pharmacists, etc.
		Health Department Staff Guest Lecture: Any guest presentation, lecture, or seminar by a health department staff and held at a learning institution of any level
		Participation in Job Fairs: Any outreach activity in a community or academic setting promoting career opportunities or educating the public about careers in public health
		College Internship: Population health-oriented internships for students in any bachelor-level degree program
		High School Internship: Population health-oriented internships for students in high school
		Job Placement for Graduates: Job placement programs within health department for any education level recruit
		Health Department Staff Hold Faculty Positions: Any health department staff who are concurrently employed at a college or university to teach (including adjunct faculty)
		Informational Media Targeting Future Workforce (Website, Brochure, etc.): Any health department print or digital publication advertising careers in public health
Version 1.0 Measure 8.2.1	The workforce development plan	**Develop a training plan and schedule:** Developing a training plan that addresses any training needs in skills, knowledge, and abilities
		Assess staff competencies compared to the core public health competencies: Assess current staff skills, knowledge, and abilities compared to the 10 core public health competencies
		Evaluate gaps in staff competencies compared to plan and address with training, etc.
Version 1.0 Measure 8.2.2 and Version 1.5 Measure 8.2.3	Provide leadership and management development activities	**Training and continuing education:** Any training, continued learning, educational opportunity, seminar, or skills development workshop for health department staff
		Leadership development activities: Any training, continued learning, educational opportunity, seminar, or workshop specifically geared towards management skills development or leadership cultivation for health department staff
		Tuition assistance programs: Any reimbursement for health department staff to attend degree or non-degree educational programs in an academic setting
		Support professional conference attendance and presentation: Any reimbursement or support by giving PTO for health department staff to attend or present at a professional conference
		Support professional organization membership: Any reimbursement for health department staff to hold memberships at professional organizations
Version 1.0 Measure 8.2.3 and Version 1.5 Measure 8.2.5	Provide training or technical assistance to local health departments if a state health department	**Provide technical assistance:** Any more technical assistance, consulting, training, support to LHDs from SHDs for health department functions**.**
		Provide training to local health departments: Any broader training and education provided to LHDs by SHDs
		Provide tuition reimbursement for LHD staff: Any SHD-funded education reimbursement programs to promote public health professional training and recruitment

Notes: Note that because some of the measure numbers changed between Versions 1 and 2, Version 1 measure 8.2.2 data and its matching Version 1.5 measure 8.2.3 data were aggregated. As well, Version 1 measure 8.2.3 data were aggregated with Version 1.5 measure 8.2.5 data.

Table 2. Public Health Department Accreditation Assessment Scores and Action Plan Summary for Domain 8

Measure	Measure Description	Number of Jurisdictions	Mean Score	Range in Assessment Score	Action Plans Required N (%)
8.1.1	Encourage the development of a sufficient number of qualified public health workers	State (n=19)	4.00	(4 - 4)	0 (0.00%)
		Local (n=115)	3.85	(1 - 4)	3 (2.61%)
		Total (n=134)	3.87	(1 - 4)	3 (2.24%)
8.2.1	The workforce development plan	State (n=19)	3.45	(1 - 4)	1 (5.26%)
		Local (n=115)	3.51	(1 - 4)	4 (3.48%)
		Total (n=134)	3.50	(1 - 4)	5 (3.73%)
8.2.2	Provide leadership and management development activities	State (n=19)	3.85	(3 - 4)	0 (0.00%)
		Local (n=115)	3.84	(2 - 4)	3 (2.61%)
		Total (n=134)	3.84	(2 - 4)	3 (2.24%)
8.2.3	Provide training or technical assistance to local health departments if a state health department	State (n=19)	3.47	(2 - 4)	1 (5.26%)

Notes: Health departments refer to state and local health departments. The activities selected were listed in the PHAB described Required Documents in *the Standards and Measures*. Action Plans denote required action on behalf of the health department for measures that were not sufficiently demonstrated in the original documentation or during the site visit. The mean score reflects averages on a 4-point scale in which (1 = Not Demonstrated, 2 = Slightly Demonstrated, 3 = Largely Demonstrated, 4 = Fully Demonstrated.

Table 3. Frequencies of Activities within Each Domain 8 Measure

Health Department Activities	State Health Department Frequency N (%)	Local Health Department Frequency N (%)	Total Frequency N (%)
8.1.1: Encourage the development of a sufficient number of qualified public health workers			
School of Public Health Internship	16 (84.21%)	45 (39.13%)	61 (45.52%)
Clinical Internship	4 (21.05%)	35 (30.43%)	39 (29.10 %)
HD Staff Guest Lecture	3 (15.79 %)	28 (24.35%)	31 (23.13 %)
Participation in Job Fairs	2 (10.53%)	28 (24.35 %)	30 (22.39 %)
College Internship	4 (21.05 %)	17 (14.78%)	21 (15.67 %)
High School Internship	0 (0.00%)	14 (12.17%)	14 (10.45%)
Job Placement for Graduates	3 (15.79%)	7 (6.09%)	10 (7.46 %)
HD Staff Hold Faculty Positions	3 (15.79%)	2 (1.74 %)	5 (3.73 %)
Informational Media Targeting Future Workforce (Website, Brochure, etc.)	2 (10.53 %)	3 (2.61 %)	5 (3.73 %)
8.2.1: The Workforce Development Plan			
Develop a training plan and schedule	17 (89.47 %)	108 (93.91%)	125 (93.28%)
Assess staff competencies compared to the core public health competencies	18 (94.74 %)	99 (86.09%)	117 (87.31%)
Evaluate gaps in staff competencies compared to plan and address with training, etc.	15 (78.95 %)	96 (83.48 %)	111 (82.84%)
8.2.2: Provide leadership and management development activities			
Training and continuing education	19 (100.00%)	110 (95.65 %)	129 (96.27%)
Leadership development activities	19 (100.00%)	110 (95.65 %)	129 (96.27%)
Tuition assistance programs	8 (42.11%)	16 (13.91%)	24 (17.91%)
Support professional conference attendance and presentation	0 (0.00%)	15 (13.04 %)	15 (11.19%)
Support professional organization membership	0 (0.00%)	7 (6.09 %)	7 (5.22%)
8.2.3: Provide training or technical assistance to local health departments if a state health department			
Provide technical assistance	16 (84.21%)	N/A	16 (84.21%)
Provide training to local health departments	10 (52.63 %)	N/A	10 (52.63 %)
Provide tuition reimbursement for LHD staff	1 (5.26 %)	N/A	1 (5.26 %)

Notes: Health departments refer to state, tribal, local health departments. Tribal and territorial health departments are referred to as local health departments. The activities selected were listed in the PHAB described Required Documents in *the Standards and Measures*. Measure 8.2.3 only applies to state health departments.

Table 4. Domain 8 Opportunities for Improvement Impact on Measure Assessment Score

Health Department Approach	Health Department Type	Approach Predictive of Additional Point in 4-Point Assessment Score	95% Confidence Interval	P Value
8.1.1: Encourage the development of a sufficient number of qualified public health workers				
Internship or job placement program described is *not* population health focused	SHDs	N/A	N/A	N/A
	LHDs	β= -2.70	(-3.00, -2.39)	p<0.001***
	All HDs	β= -2.70	(-2.98, -2.41)	p<0.001***
Partnership with educational organization *not* documented in MOU	SHDs	N/A	N/A	N/A
	LHDs	β= 0.15	(-0.67, 0.98)	p<0.72
	All HDs	β= 0.15	(-0.62, 0.92)	p<0.70
Health department efforts do not promote future careers in public health directly	SHDs	N/A	N/A	N/A
	LHDs	β= -0.44	(-0.80, -0.08)	p<0.02**
	All HDs	β= -0.44	(-0.77, -0.12)	p<0.01**
8.2.1: The Workforce Development Plan				
Missing clear identification of gap between current staff competencies and needs	SHDs	β= -0.87	(-1.84, 0.11)	p<0.08*
	LHDs	β= -0.89	(-1.37, -0.40)	p<0.001***
	All HDs	β= -0.88	(-1.30, -0.46)	p<0.001***
Examples of trainings provided were dated before the WFD plan or not aligned with the schedule outlined in the WFD	SHDs	N/A	N/A	N/A
	LHDs	β= -0.83	(-1.26, -0.41)	p<0.001***
	All HDs	β= -0.83	(-1.27, -0.40)	p<0.001***
WFD not reviewed and updated annually	SHDs	β= -0.44	(-2.36, 1.49)	p<0.64
	LHDs	β= -1.07	(-1.68, -0.45)	p<0.001***
	All HDs	β= -0.98	(-1.56, -0.39)	p<0.001***
8.2.2: Provide leadership and management development activities				
Timeframe did not align with WFD	SHDs	N/A	N/A	N/A
	LHDs	β= -1.371	(-1.96, -0.78)	p<0.001***
	All HDs	β= -1.37	(-1.93, -0.80)	p<0.001***

Notes: Health departments refer to state (SHD) and local health departments (LHDs). The opportunities for improvement identified were commonly cited in the "opportunities for improvement" section of PHAB site visit report data. N/A denotes that the data is not available, which was the case for SHDs for multiple measures due to the small sample size. Measure 8.2.3 only applies to state health departments and was excluded from this table due to small sample size and the lack of site visit report data on opportunities for improvement for state health departments. Significance level is denoted as follows: p<0.10*, p<0.05**, and p<0.001***.

Supplemental Digital Content, Table 1. Attributes of Health Departments Included in PHAB Domain 8 Workforce Development Study

Attribute	Frequency	Percentage
State and Local Health Departments		
State Health Departments	115	14.18%
Local Health Departments	19	85.82%
Region		
Northeast and Mid-Atlantic Region	24	17.91%
Southeast Region	16	11.94%
Midwest Region	54	40.30%
Mountain and Northwest Region	21	15.67%
Southwest and Western Region	19	14.18%
Populations Served		
<25,000	3	(2.24%)
25,000 – 49,999	9	(6.72%)
50,000 – 99,999	23	(17.16%)
100,000 – 249,999	33	(24.63%)
250,000 – 499,999	17	(12.69%)
500,000 – 999,999	20	(14.93%)
1,000,000 – 2,999,999	16	(11.94%)
3,000,000+	13	(9.70%)
Organizational Structure		
Centralized	12	(8.96%)
Decentralized	102	(76.12%)
Mixed	2	(1.49%)
Shared	11	(8.21%)
Annual Fiscal Health Department Budget		
<= $500,000	1	(0.75%)
$500,001 - $1,000,000	2	(1.49%)
$1,000,001 - $10,000,000	59	(44.03%)
$10,000,001 - $100,000,000	49	(36.57%)
$100,000,001 - $1,000,000,000	19	(14.18%)
>=$1,000,000,000	4	(2.99%)
Full-Time Employees (FTEs)		
< 10	2	(1.49%)
11-50	29	(21.64%)
51-100	33	(24.63%)
101-250	24	(17.91%)
251-500	23	(17.16%)
1,001-2,500	10	(7.46%)
2,501-5,000	8	(5.97%)
5,001-10,000	4	(2.99%)
10,001-15,000	0	(0.00%)
>15,000	1	(0.75%)

Notes: Health departments refer to state and local health departments. Regions are defined as: Northeast and Mid-Atlantic (CT, MA, ME, NH, RI, VT, NJ, DE, MD, PA, VA, WV, DC); Southeast (AL, FL, GA, KY, MS, NC, SC, TN); Midwest (IL, IN, OH, MI, MN, WI, IA, KS, MO, NE); Mountain and Northwestern (CO, MT, ND, SD, UT, WY, AK, ID, OR, WA); Southwest and Western (AR, LA, NM, OK, TX, AZ, CA, HI, NV). Organizational structure refers to the public health agency structure within the state of the responding organization. Data was obtained through the PHAB profile data submitted by health departments with their accreditation application to PHAB.

Supplemental Digital Content, Table 2. Relationship between Activities within Each Domain 8 Measure and Assessment Scores

Measure & Activities	Health Department Type	Approach Predictive of Additional Point in 4-Point Assessment Score	95% Confidence Interval	P Value
8.1.1: Encourage the development of a sufficient number of qualified public health workers				
School of Public Health Internship	SHDs	N/A	N/A	N/A
	LHDs	β= 0.25	(0.03, 0.46)	p<0.03**
	All HDs	β= 0.22	(0.03, 0.42)	p<0.02**
Clinical Internship	SHDs	N/A	N/A	N/A
	LHDs	β= -0.16	(-0.39, 0.08)	p<0.19
	All HDs	β= -0.14	(-0.34, 0.07)	p<0.18
HD Staff Guest Lecture	SHDs	N/A	N/A	N/A
	LHDs	β= 0.15	(-0.11, 0.40)	p<0.26
	All HDs	β= 0.13	(-0.09, 0.35)	p<0.24
Participation in Job Fairs	SHDs	N/A	N/A	N/A
	LHDs	β= 0.01	(-0.24, 0.26)	p<0.95
	All HDs	β= 0.01	(-0.22, 0.23)	p<0.95
College Internship	SHDs	N/A	N/A	N/A
	LHDs	β= 0.17	(-0.14, 0.48)	p<0.27
	All HDs	β= 0.14	(-0.11, 0.40)	p<0.28
High School Internship	SHDs	N/A	N/A	N/A
	LHDs	β= 0.17	(-0.19, 0.50)	p<0.31
	All HDs	β= 0.17	(-0.14, 0.48)	0.276
Job Placement for Graduates	SHDs	N/A	N/A	N/A
	LHDs	β= 0.16	(-0.29, 0.61)	p<0.49
	All HDs	β= 0.11	(-0.25, 0.47)	p<0.54
HD Staff Hold Faculty Positions	SHDs	N/A	N/A	N/A
	LHDs	β= 0.15	(-0.68, 0.98)	p<0.72
	All HDs	β= 0.06	(-0.46, 0.58)	p<0.82
Informational Media Targeting Future Workforce (Website, Brochure, etc.)	SHDs	N/A	N/A	N/A
	LHDs	β= 0.15	(-0.53, 0.83)	p<0.66
	All HDs	β= 0.09	(-0.42, 0.60)	p<0.73
8.2.1: The Workforce Development Plan				
Develop a training plan and schedule	SHDs	β= 2.17	(1.34, 3.00)	p<0.001***
	LHDs	β= 1.76	(1.25, 2.27)	p<0.001***
	All HDs	β= 1.84	(1.41, 2.28)	p<0.001***
	SHDs	β= 2.56	(1.18, 3.95)	p<0.001***
	LHDs	β= 1.68	(1.41, 1.96)	p<0.001***

Assess staff competencies compared to the core public health competencies	All HDs	β= 1.74	(1.47, 2.01)	p<0.001***
Evaluate gaps in staff competencies compared to plan and address with training, etc.	SHDs	β= 1.52	(0.80, 2.23)	p<0.001***
	LHDs	β= 1.62	(1.38, 1.87)	p<0.001***
	All HDs	β= 1.60	(1.38, 1.83)	p<0.001***
8.2.2: Provide leadership and management development activities				
Training and continuing education	SHDs	N/A	N/A	N/A
	LHDs	β= 0.88	(0.50, 1.26)	p<0.001***
	All HDs	β= 0.89	(0.52, 1.25)	p<0.001***
Leadership development activities	SHDs	N/A	N/A	N/A
	LHDs	β= 1.51	(1.21, 1.81)	p<0.001***
	All HDs	β=1.51	(1.22, 1.81)	p<0.001***
Tuition assistance programs	SHDs	β= 0.09	(-0.17, 0.35)	p<0.46
	LHDs	β= 0.11	(-0.13, 0.35)	p<0.37
	All HDs	β=.074	(-0.13, 0.28)	p<0.48
Support professional conference attendance and presentation	SHDs	N/A	N/A	N/A
	LHDs	β= 0.18	(-0.07, 0.43)	p<0.15
	All HDs	β=0.17	(-0.06, 0.41)	p<0.15
Support professional organization membership	SHDs	N/A	N/A	N/A
	LHDs	β= 0.17	(-0.18, 0.52)	p<0.34
	All HDs	β=0.16	(-0.18, 0.50)	p<0.34
8.2.3: Provide training or technical assistance to local health departments if a state health department				
Provide technical assistance	SHDs	β= 0.10	(-1.08, 1.27)	p<0.87
Provide training to local health departments	SHDs	β= 0.70	(-0.07, 1.46)	p<0.07*
Provide tuition reimbursement for LHD staff	SHDs	β= 1.14	(-2.61, 2.61)	p<1.00

Notes: Health departments refer to state (SHD) and local health departments (LHDs). The activities selected were listed in the PHAB described Required Documents in *the Standards and Measures*. N/A denotes that the data is not available, which was the case for SHDs for multiple measures due to the small sample size. Measure 8.2.3 only applies to state health departments. Significance level is denoted as follows: p<0.10*, p<0.05**, and p<0.001***.